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REMARKS/ARGUMENTS

In the Office Action mailed October 21, 2003, the examiner rejected claims 15-30 as allegedly obvious over Murthy in view of Mantell and/or Yagi. The Examiner also objected to the specification for lack of a Summary of Invention. Applicants respectfully request that the Examiner withdraw the objection and rejections for the reasons set out below and place claims 15-30 in condition for allowance. Applicants also respectfully request that the Examiner enter new claims 31-43 and place them in condition for allowance.

Summary of the Invention:

The Examiner objected to the specification on the ground that the "SUMMARY OF THE INVENTION" was missing. Applicant respectfully submits that a "SUMMARY OF THE INVENTION" is not required under the regulations. The regulations provide merely that:

"A brief summary of the invention . . . should precede the detailed description. Such summary should, when set forth, be commensurate with the invention as claimed"

37 CFR § 1.73. Applicants respectfully request that the Examiner withdraw the objection.

Obviousness:

The examiner rejected Claims 15-20 and 28-30 as allegedly being unpatentably obvious over US 5,658,471 (Murthy) in view of US 5,867,192 (Mantell). The Examiner also rejected Claims 21-27 as allegedly being obvious over Murthy in view of Mantell and further in view of US 6,143,190 (Yagi).

The Applicants respectfully submits that the Examiner should withdraw the rejections for failure to make a prima facie case of obviousness. In order to establish a prima facie case of obviousness, an examiner must show at least: (1) a suggestion or motivation to combine reference teachings; (2) a reasonable expectation of success; and (3) that the prior art references when combined must teach or suggest all the limitations. See MPEP § 2142-2143.3; In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). In this case, the applicant respectfully suggests that the Examiner failed to show any one of these elements.

Claim 30:

Claim 30 is not obvious over any of Murthy, Mantell or Yagi. None of Murthy, Mantell or Yagi, alone or in combination, disclose, teach or suggest all of the limitations of any of Claim 30. For example, none of Murthy, Mantell or Yagi disclose, teach or suggest, alone or in combination, at least the following limitation:

“ . . . said fluid slot formed by deep reactive ion etching to a depth of at least one-half a thickness of the silicon substrate followed by anisotropic wet etching”

Mantell recites creating a channel 16 with an “overall depth of the channel 16 from the main surface of channel plate 14 to the bottom of the channel of approximately 17-18 micrometers.” 4:11-13. The channel is created by “a 3-micrometer deep reactive ion etch” followed by a wet etch. 4:20-23. None of Mantell, Murthy or Yagi disclose, teach or suggest all of the limitations of Claim 30.

No Motivation to Combine:

As discussed in responses to the previous office actions, the Examiner has not shown a motivation to combine Mantell with Murthy. Mantell discloses a so-called side shooter. As such, it does not disclose, teach or suggest at least the following limitations:

“ . . . a plurality of fluid [(ink)] drop generators formed on a first surface of said silicon substrate”

or

“ . . . a fluid [(ink)] feed slot extending from a second surface of said silicon substrate to said first surface”

Claims 15, 18 and 27.

Moreover, the Examiner has not demonstrated a motivation to combine the etching techniques used to create the side-shooter channels of Mantell with either one of Murthy or Yagi. Because there was no motivation to combine, there was no expectation of success.

The Examiner asserts, at page 5 of the Office Action, that “the motivation for combining Mantell et al. and Murthy et al. Is found that it is the generally available knowledge to one having ordinary skill in the art to use the above technique disclosed by Mantell et al. for creating cavities in a silicon substrate such as ink/fluid feed slots in the printhead disclosed by Murthy et al. to obtain the above advantage.” The Applicants respectfully submit that this conclusion is in error.

The purported “advantage” of Mantell, that the Examiner refers to in the Office Action, is that, “the wet etching process is self-terminating.” Applicants respectfully submit that this purported advantage is not applicable to the claims and that the purported advantage does not support a finding of a motivation to combine Murthy with Mantell.

Mantell recites creating a "channel 16." 4:10. The channel has an "ultimate depth of the final truncated-parallelogram channel relative to the wafer surface" 4:14-16. Mantell does not disclose, teach or suggest, "a fluid feed slot extending from a second surface of said silicon substrate to said first surface . . ." as recited in Claim 15. Although Murthy recites an, "ink feed slot," it does not disclose, teach or suggest, "said fluid slot formed by deep reactive ion etching followed by anisotropic wet etching, and having an opening at the first surface having a width W1 that is less than a width W2 of an opening at the second surface . . ." as recited in Claim 15. Neither Murthy nor Mantell disclose, teach or suggest combining the "ink feed slot" of Murthy with the method of creating a channel having a depth, as shown in Mantell, to practice all of the limitations of any of claims 15-30.

New Claims 31-43:

Applicants respectfully submit that new claims are fully supported in the Specification. Claims 31-37 and 39-43 are supported, for example, at least at paragraph 0025. Claims 38-43 are supported, for example, at least at paragraph 0022.

New Claims 31-43 are not obvious over any of Murthy, Mantell or Yagi, alone or in combination, for reasons similar to those give with respect to claims 15-30 above. The Examiner has not established a motivation to combine Mantell with either one of Murthy or Yagi. None of Murthy, Mantell or Yagi disclose, teach or suggest, alone or in combination, all of the limitations of any one of new claims 31-43.

New Claims 32, 35 and 37 and Claims 33 and 36:

Claims 30, 32, 35 and 37 are not obvious over any of Murthy, Mantell or Yagi for reasons similar to those given above with respect to Claim 30. None of Murthy, Mantell or Yagi, alone or in combination, disclose, teach or

suggest all of the limitations of any of New Claims 32, 33 or 35-37. For example, none of Murthy, Mantell or Yagi disclose, teach or suggest, alone or in combination, at least the following limitations:

“ . . . said fluid slot was formed by deep reactive ion etching to a depth of at least one-half a thickness of the silicon substrate followed by anisotropic wet etching”

Claims 32, 35, 37; or

“ . . . said fluid slot was formed by deep reactive ion etching to a depth of at least about 475 micrometers.”

Claims 33, 36.

Claims 38-43:

New Claims 38-43 are not obvious over any of Mantell, Murthy or Yagi, alone or in combination. None of Mantell, Murthy or Yagi disclose, teach or suggest, alone or in combination all of the limitations of any of Claims 38-43. For example, none of Mantell, Murthy or Yagi disclose, teach or suggest, alone or in combination, at least the following limitations:

“ . . . said fluid feed slot was formed by deep reactive ion etching to a depth DD, with an angle of re-entrancy α ; and
W1 equals about $W2 + 2(DD \cdot \tan \alpha + (DD - STH / \tan(54.7 \text{deg.})))$.”

Claims 38-43.

CONCLUSION

The outstanding objections and rejections have been addressed. Applicants request that the Examiner enter the amendments and place all of claims 15-43 in condition for allowance.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Peter Reitan', enclosed within a large, loopy oval shape.

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